



Convert Water Tank Blanket from Natural Gas to Produced CO2 Gas

Applicable sector(s):

Production [x] Processing [ ] Transmission and Distribution [ ]

Partners reporting this PRO: Chevron USA Production Company

Other related PROs: Install Downhole Separator Pumps

Technology/Practice Overview

Description

Crude oil production often contains water, which is separated at the well head. The produced water is saturated with methane and light hydrocarbons at the pressure of the gas/oil/water separator. This water is normally transferred to a fixed roof storage tank where a drop in pressure releases gas from the solution. This gas can also mix with the air in the tank to form an explosive mixture. To exclude oxygen from the water tank and prevent a hazardous situation, some operators blanket the vapor space in the tank with natural gas. As the tank fills and empties of water, the produced gas and blanket gas are emitted into the atmosphere through the roof vent.

One partner reported switching the water tank blanket from natural gas to CO2-rich produced gas. Some gas production, such as coal-bed methane, is rich in CO2. This acid gas is normally separated in gas processing plants, and either vented to the atmosphere or injected into a crude oil reservoir for enhanced oil recovery. This CO2-rich gas may be a better choice for tank blanket gas than methane-rich natural gas.

Principal Benefits

Reducing methane emissions was:

The primary benefit of the project [x] An associated benefit of the project [ ]

Operating Requirements

Acid is formed when the CO2 dissolves in the produced water. As a result, the water tank must be internally coated to protect against corrosion.

Applicability

This practice can be implemented where there is a source of CO2 - rich produced gas or a nearby gas processing plant with acid gas removal.

Methane Savings

2,000 Mcf/yr

Costs

Capital Costs (including installation)

<\$1,000 [ ] \$1,000-\$10,000 [x] >\$10,000 [ ]

Operating and Maintenance Costs

(Annual)

<\$100 [ ] \$100-\$1,000 [ ] >\$1,000 [ ]

Payback (Years)

0-1 [ ] 1-3 [x] 3-10 [ ] >10 [ ]

Methane Emission Reductions

Methane emissions savings assume the partner reported compositions of the natural gas blanket (90% methane) and the CO2 rich replacement gas (5% methane). The partner reported saving 32,600 Mcf/yr of methane by converting the water tank blankets on 9 units at a water treatment station from fuel gas to CO2-rich produced gas.

Economic Analysis

Basis for Costs and Savings

Methane emissions savings of 2,000 Mcf/yr is based on blanketing a 4,000-barrel water tank that is emptied twice a week.

Discussion

The value of fuel gas saved by this practice generally has a good payback. Required capital costs would be for piping CO2 to produced water tank. Minor additional O&M costs are associated with operating the rich CO2 line. Costs assume that the water tanks are already internally coated for corrosion protection.